## REMARKS

**General:**

Claims 32-40 are now pending in the application. Claims 1-31 have been canceled. Support for new claims 32-40 can be found throughout the specification as filed. No new matter has been added by the amendments.



**Claim rejections:**

Claims 1-12 and 13 were rejected under 35 U.S.C. § 112, second paragraph, as indefinite. Claims 1-6, 12, 16 and 27 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,221,679 (Smith, Jr. *et al.*) Claims 7-11, 13-25, and 28-30 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Smith Jr., *et al.* in view of U.S. Patent No. 5,225,888 (Selwyn, *et al.*).

New claims 32-40 have been drafted to overcome the formal matters on which the rejection of claims 1-12 and 13 was based. New claims 32-40 are deemed to be in full compliance with 35 U.S.C. § 112.

New claim 32 is similar in scope to claim 1, and expresses the inventive concept more clearly. As specified in claim 32, in the present invention the time-varying emission or absorption spectrum of the process plasma is converted into a signal which is then processed. The processing involves comparison with a *predicted output*. In Smith, Jr., *et al.*, comparison appears to be done merely with a library of calibration or test runs in order to characterise the current process step as normal or abnormal, whereas in the present invention the comparison is with a predicted output. This makes it possible to determine the current stage of the process in relation to the predicted process, and thus to predict the endpoint.

Furthermore, claim 32 specifies that the comparison is effected by way of *shape recognition*. Smith, Jr., *et al.*, appears to effect comparison by comparing absolute values at particular frequencies. As noted in the introduction to the present application, the plasma processes with which the present invention is most concerned, such as semiconductor etch processes, generate considerable quantities of electrical, thermal, optical, vibrational and RF noise. This environment militates against comparison using measurement of absolute values, especially as significant progress in the process may produce quite small changes in absolute values. The present invention makes use of the fact that shape recognition techniques applied to

the comparison of the plasma signal with a prediction give a greatly improved immunity to the effects of noise interference.

The examiner combined the Smith, Jr., *et al.*, with Selwyn, *et al.*, as teaching known forms of spectrometric devices. However, the combination still falls short of suggesting the invention as claimed. Although various means of examining optical spectra are known *per se*, in the preferred forms of the present invention, as defined in claim 34 for example, there is the combination of effecting the foregoing comparison of the output signal using shape recognition in the time domain with, additionally, the preliminary use of shape recognition on the spectral characteristics in the optical frequency domain. This combination is particularly effective in monitoring small variations in a complex plasma emission or absorption subject to a high level of noise. This combination is not taught or suggested by the prior art of record, no matter how the art may be combined.

**Conclusion:**

Based upon the foregoing amendments, the rejections are deemed moot, and the application is believed to be in condition for allowance. Withdrawal of all rejections and objections, and an early notice of allowance of claims 32-40, are earnestly solicited.

Respectfully submitted,

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